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NAVMEDCOMINST 10110.1
AFR 160-95

Medical Services

Nutrition Allowances, Standards, and Education

Headquarters
Departments of the Army,
the Navy, and the Air Force
Washington, DC
15 May 1985

Unclassified

SUMMARY of CHANGE

AR 40–25/NAVMEDCOMINST 10110.1/AFR 160–95
Nutrition Allowances, Standards, and Education

This is a transitional reprint of this publication which places it in the new UPDATE format. Any previously published permanent numbered changes have been incorporated in to the text.

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Effective 15 May 1985

Medical Services

Nutrition Allowances, Standards, and Education

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History. This UPDATE issue is a reprint of the original form of this regulation that was published on 15 May 1985. Since that time, no changes have been issued to amend the original. This reprint originally carried a cover date of 20 November 1987. This publication has been reorganized to make it compatible with the Army publishing database. No content has been changed.

Summary. This joint regulation on nutrition allowances, standards, and education has been revised. It defines the nutrition responsibilities of The Surgeons General of the Army, the Navy, and the Air Force. This regulation—

a. Provides a current statement of the military recommended dietary allowances.

b. Sets nutrient standards for packaged rations.

c. Provides a standardized nutrient density index for normal and reduced calorie menu planning.

d. Provides nutrition education guidance to assist the military in promoting a healthful diet.

Applicability. This regulation applies to all active elements of the Army, Navy, and Air Force. It also applies to the Reserve Components of these Services.

Proponent and exception authority. Not applicable

Impact on New Manning System. This regulation does not contain information that affects the New Manning System.

Army management control process. Not applicable.

Supplementation. Supplementation of and exceptions to this regulation are prohibited without prior approval from HQDA (DASG–PSP), WASH DC 20310–2300; Department of the Navy, Naval Medical Command, WASH DC 20732; or HQ USAF/SGB, Bolling AFB, WASH DC 20332–6188, for each respective Service. Nutrient standards prescribed in table 2–3 for operational and restricted rations are not subject to exception.

Interim changes. Interim changes to this regulation are not official unless they are authenticated by The Adjutant General, Headquarters, Department of the Army (HQDA). Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

Suggested Improvements. The Army office of primary interest in this regulation is the Office of The Surgeon General, HQDA. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA (DASG–PSP), WASH DC 20310–2300. Other users may send comments and recommendations through normal channels to their respective Surgeons General: Naval Medical Command, ATTN: MEDCOM–312, Navy Department, WASH DC 20372, for the NAVY; and HQ USAF/SGB, WASH DC 20332–6188, for the Air Force.

Distribution. Contents (Listed by paragraph and page number)

* This regulation supersedes AR 40–25/BUMEDINST 10110.3E/AFR 160–95, 30 August 1976.

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Chapter 1
Introduction

1–1. Purpose
This regulation defines the nutrition responsibilities of The Surgeons General of the Army, Navy, and Air Force by—

a. Establishing dietary allowances for military feeding.

b. Prescribing nutrient standards for packaged rations.

c. Providing basic guidelines for nutrition education as prescribed in DOD 1338.10–M.

1–2. References
a. Required publications.

(1) DOD Manual 1338.10–M, Manual for the Department of Defense Food Service Program. (Cited in para 1–1.)

(2) TB MED 507/NAVMED P–5052–5/AFP 160–1, Occupational and Environmental Health: Prevention, Treatment, and Control of Heat Injury. (Cited in para 2–5 *i* .)

b. Related publications. (A related publication is merely a source of additional information. The user does not have to read it to understand this regulation.)

(1) *Recommended Dietary Allowances,* ninth revised edition, 1980. (Copies may be obtained from the Office of Publications, National Academy of Sciences, 2101 Constitution Avenue, WASH DC 20418.)

(2) United States Department of Agriculture Handbook 8 Series, *Composition of Foods, Raw, Processed, and Prepared.* (Copies may be obtained from the Superintendent of Documents, US Government Printing Office, WASH DC 20402.)

1–3. Explanation of abbreviations and terms
Abbreviations and special terms used in this regulation are explained in the glossary.

1–4. Responsibilities
a. The Surgeon General, Department of Army (TSG, DA). TSG, DA, will act as the Department of Defense (DOD) Executive Agent for Nutrition and will—

(1) Establish dietary allowances for military personnel subsisting under normal operating conditions.

(2) Establish nutrient standards for packaged rations.

(3) Adjust dietary allowances and nutrient standards to meet variations in age, sex, body size, physical activity, climate, or other conditions that may influence nutritional requirements.

(4) Evaluate current and proposed operational rations. Recommend adjustments and other actions to ensure that the nutrient composition of the rations as offered for consumption meets the nutritional requirements of personnel in all operational environments.

(5) Coordinate the development of nutrition education programs for all Services.

(6) Provide qualified representatives to advise committees which support the DOD Food Service Program in matters that affect the nutritional quality of the military diet.

b. The Surgeons General of the Army, Navy, and Air Force. TSGs will—

(1) Review requests and make appropriate recommendations for deviations from established nutritional standards.

(2) Evaluate adjustments to planned diets (menus). Make recommendations to ensure that the nutrient composition of the diet as offered will promote and maintain health.

(3) Evaluate the nutritional status of personnel and report nutritional deficiencies or excesses.

(4) Recommend standard methods to assess body composition.

(5) Provide nutritional guidance to the Services' weight control and physical fitness programs.

(6) Develop and implement a Service-wide nutrition education program for military personnel and their dependents. Provide information to motivate the consumption of a nutritionally adequate diet that contains all of the macronutrients and micronutrients needed to promote health and to maintain desirable body weight.

(7) Assist in providing food service personnel with knowledge and skills of proper food preparation that will maintain the nutritional value of foods.

(8) Provide qualified representatives to—

(a) Advise local food service organizations, such as menu boards, on matters that affect the nutritional quality of meals prepared and consumed.

(b) Serve as consultants to installation commanders on the development and evaluation of nutritional aspects of the Services' weight control and physical fitness programs.

Chapter 2
Nutritional Allowances and Standards

2–1. Military recommended dietary allowances
a. Table 2–1 prescribes military recommended dietary allowances (MRDA) for military personnel. these allowances are adapted from the National Academy of Sciences/National Research Council publication *Recommended Dietary Allowances* (RDA), ninth revised edition, 1980. MRDA are the daily essential nutrient intake levels presently considered to meet the known nutritional needs of practically all 17- to 50-year old, moderately active military personnel.

b. MRDA are intended for use by professional personnel involved in menu planning, dietary evaluation on a population basis, nutrition education, nutrition research, and food research and development. MRDA are based on estimated nutritional requirements. They provide broad dietary guidelines for healthy military personnel.

c. MRDA represent recommended daily nutrient intake levels, which should meet the physiological requirements of nearly all healthy military personnel. The energy allowances shown in table 2–1 represent ranges of caloric intake reflecting wide variations in energy requirements among individuals at similar levels of activity. These energy allowances are designed to maintain desirable body weight for healthy service members under conditions of moderate physical activity in an environment compatible with thermal comfort. The allowances are not to be interpreted as individual requirements. Also, they may not apply to personnel requiring special dietary treatment for conditions such as infection, chronic disease, trauma, unusual stress, pregnancy, lactation, or weight reduction. The allowances are subject to adjustments as outlined in paragraphs 2–3 and 2–4.

d. MRDA refer to the nutrient concentrations of edible portions of food offered for consumption. Nutrient losses may occur during food processing and preparation. These nutrient losses must be considered when nutrient composition tables are used to compare menus or food products with these allowances. The most recent edition of the United States Department of Agriculture Handbook 8 series, *Composition of Foods, Raw, Processed, and Prepared,* will be used as the standard reference nutrient composition data base.

2–2. Estimated safe and adequate daily dietary intakes
Table 2–2 is based on the RDA and provides estimated safe and adequate adult dietary intake ranges for selected nutrients, which are known to be essential in the diet, but for which recommended levels of intake have not been established.

2–3. Nutrient standards for operational and restricted rations
Table 2–3 prescribes nutrient standards, which are the criteria for evaluating the nutritional adequacy of operational and restricted rations. Operational rations include the individual combat ration such as the meal, combat, individual (MCI); the meal, ready-to-eat (MRE); and other rations (A, B, or T) used to support operations in the field. A level of 3600 kilocalories (kcal) is required for operational rations to meet energy demands associated with extended field operations. (See para 2–4.) Total fat calories should not exceed

40 percent of the energy value of the operational ration or 160 grams (gm). It is essential that ration planners compensate for losses of nutrients, such as ascorbic acid, thiamin, riboflavin, niacin, and pyridoxine (vitamine B6), which may occur during storage of operational and restricted rations.

a. Nutritionally complete, individual operational rations such as the MCI and MRE must be formulated so that the nutrient content of each day's ration satisfies these nutrient standards. It is desirable that each combat meal provides one-third of the nutrient standard.

b. Under certain operational scenarios such as long-range patrol, assault and reconnaissance, and other situations where resupply is unavailable, it may be necessary for troops to subsist for short periods (up to 10 days) on a restricted ration. To minimize loss of performance, the restricted ration should provide 1100 to 1500 kilocalories, 50 to 70 grams of protein, and a minimum of 100 grams of carbohydrate on a daily basis. Vitamins and minerals should be provided at the levels prescribed in table 2–3. This restricted ration is not appropriate for use under extreme, cold climates.

c. The survival food packet is a packaged food bar of approximately 400 kilocalories derived from carbohydrates. The low protein content spares body water by reducing the obligatory water demand caused by consuming high protein foods. The nutrient standards for operational and restricted rations do not apply to the survival food packet. This packet is designed to be consumed for periods of less than 4 consecutive days.

2–4. Energy requirements

The following factors affect individual energy requirements:

a. Age. MRDA are intended for men and women 17 to 50 years of age. Upon completion of growth, energy requirements for adults gradually decline with age due to a reduced resting metabolic rate and curtailment in physical activity. With the 17 to 50 year military age range, age-related differences in caloric allowances appear to be minimal under conditions of similar physical activity.

b. Body size. The energy allowances are established for average sized personnel, which represent approximately 70 percent of the military personnel between the ages of 17 and 50 years. (See table 2–1.) To maintain desirable body weight, caloric intake must be adjusted for variable energy requirements due to individual differences in lean body mass reflected by body size. Large individuals (such as those with greater height and appropriately higher weight) have slightly higher resting, basal metabolic rates. They, therefore, require more total energy per unit of time for activities that involve moving body mass over distance. Smaller sized individuals require fewer calories.

c. Physical activity. Differences in energy needs are largely due to differences in the amount of time an individual performs moderate and heavy work tasks in contrast to light or sedentary activities. MRDA for energy in table 2–1 are for military personnel who are moderately active and living in a temperate climate or in a thermally neutral environment. Total energy requirements are influenced by the intensity and duration of physical activity. For example, a day of moderate physical activity may include 8 hours of sleeping, 12 hours of light activity, and 4 hours of moderate to heavy activity. For military personnel doing heavy work or involved in prolonged, vigorous physical training, the recommended caloric allowance should be increased by at least 25 percent (approximately 500 to 900 kilocalories).

d. Climate. MRDA for energy intake are established for personnel in a temperate climate. (See table 2–1.) When there is prolonged exposure to cold or heat, energy allowances may need adjustment.

(1) *Cold environment.* In a cold environment (mean temperature less than 14°C (57.2°F), the energy cost of work for garrison troops is approximately 5 percent greater than in a warmer environment. There is an additional 2 to 5 percent increase in energy expenditure associated with carrying the extra weight of heavy, cold weather clothing and footgear (the "hobbling" effect). Garrison personnel may require an extra 150 to 350 kilocalories per day under these conditions. Energy allowances of 4500 calories for men and 3500 calories for women are required to support adequately clothed troops maneuvering for prolonged periods (several hours) with heavy gear on foot, snowshoes, and skis over snow- or ice-covered terrain. This increased energy allowance does not apply to troops stationed in cold climates who are engaged in moderate activity within a garrison setting.

(2) *Hot environment.* In a hot climate, loss of appetite may cause a voluntary but undesirable reduction in caloric intake below the level of need. This loss of appetite may be most noticeable after troops have arrived in a hot environment and before the process of acclimatization is completed. When personnel are required to perform the same amount of work in a hot environment as in a temperate environment, the caloric expenditure will be increased. Little adjustment appears to be necessary for a change in environmental temperature between 20°C (68°F) and 30°C (86°F). It is desirable under conditions of moderate physical activity to increase the caloric allowance by at least 0.7 percent for every degree centigrade rise in average ambient temperature above 30°C (86°F). Daily energy requirements under extremely hot conditions (greater than 40°C (104°F), may reach 56 kcal/kilogram (kg) of body weight.

(3) *Nuclear, biochemical, and chemical environment.* Certain conditions will require special guidance and nutrient formulation not described in this regulation. One such condition is when troops are operating in contaminated environments for more than 6 hours while wearing protective clothing.

2–5. Nutrient discussion

a. Protein. MRDA for protein are based, in part, on an estimated nutritional requirement of 0.8 gm/day/kg of body weight. (See table 2–1.) For military personnel within the reference weight range, protein recommendations are set between 48 to 63 gm/day for males and 37 to 50 gm/day for females. These computed protein levels have been further increased to 100 gm/day for male and 80 gm/day for female personnel. This increase reflects usual intake patterns and helps to maintain a high level of palatability and food acceptance among military personnel. These allowances are based on the consumption of a diet containing mixed proteins of animal and vegetable origin. A total day's protein intake of more than 100 gm/day has not been shown to improve heavy physical performance.

b. Fat. Fats are important in the diet to furnish energy, provide essential fatty acids, transport fat soluable vitamins and aid in their absorption, increase palatability, and give meal satisfaction. It is becoming increasingly clear that excessive amounts of total fat may lead to an increased risk of coronary heart and vascular disease. For this reason, it is recommended that the calories derived from total dietary fat should not exceed 35 percent under garrison feeding conditions. Higher proportions of fat calories are acceptable in combat, arctic, or other operational rations to increase caloric density. Emphasis should be placed on planning the military menu with lower fat concentrations while maintaining acceptability. A reduction of fat calories in the diet can be achieved by lowering added fats during food preparation and replacing foods high in fat with lean meats, fish, poultry, low fat milk, and other low fat dairy products in the military menu. As fat calories are reduced in the diet, it is recommended that the current level of about 7 percent of caloric intake as polyunsaturated fat be maintained to ensure an adequate intake of essential fatty acids.

c. Carbohydrate. Carbohydrates should contribute approximately 50 to 55 percent of the total dietary energy. It is recommended that simple, refined, and other processed sugars provide only about 10 percent of total dietary energy. The remaining carbohydrate calories should come from complex carbohydrates such as starches and naturally occurring sugars found in fruits, vegetables, and milk.

d. Calcium and phosphorus. MRDA are the same for both calcium (Ca) and phosphorus (P), although a wide variation in the Ca:P ratio is tolerated. In the presence of adequate vitamin D nutriture, a ratio of between 1:1 to 1.5:1 is nutritionally desirable.

e. Iron, ascorbic acid, and animal protein. The absorption of iron, a nutrient involved in maintaining optimal aerobic fitness, can be significantly affected by the composition of foods in a particular meal. Heme iron from animal protein sources is better absorbed

(approximately 23 percent) than nonheme iron (approximately 3 to 8 percent) which is found in both animal and many plant food sources. Certain cereal and legume proteins are known to reduce the bioavailability of nonheme iron. The nonheme iron absorption rate can be more than doubled when nonheme iron is consumed with a modest serving of meat, fish, poultry, or a source of ascorbic acid (vitamin C) at the same meal. The dietary iron allowance for females and 17- to 18-year old males is 18 milligrams (mg)/day, or 7.5 and 5.6 mg/1000 calories respectively. Moderately active female personnel consuming an average of 2400 calories per day may require supplemental iron to meet the recommended 18 mg/day. Issuing supplemental iron should be done on an individualized basis after a medical evaluation.

f. Iodine. Wide variation occurs in the amount of iodine present in food and water. All table and cooking salt used should be iodized to ensure an adequate intake of 150 micrograms (mcg) of iodine per day.

g. Fluoride. Fluoride is an essential nutrient which is found in the enamel of teeth and bone. This nutrient is an important factor in preventing tooth decay. Fluoride may confer some protection against certain degenerative bone diseases. Fluoride is found in varying amounts in most foods and water supplies. Maintaining a fluoride concentration of about 1 mg/liter (1 part per million) in water supplies has proven to be safe, economical, and efficient in reducing the incidence of dental caries.

h. Sodium. Sodium is the principal cation involved in maintaining osmotic equilibrium and extracellular fluid volume in the body.

(1) Under conditions of normal ambient temperature and humidity, the healthy adult can maintain sodium balance with an intake of as little as 150 mg/day (381 milligrams of salt). While daily intake below 2000 milligrams of sodium are generally considered unpalatable, 3300 milligrams of sodium/day represents a lower acceptable limit to which the American population can adapt. The average young civilian male consumes approximately 5500 milligrams of sodium/day in food plus an additional 20 percent (1000 milligrams) as added salt. Although dietary levels of sodium for the military population are unknown, the average intake may well exceed the civilian level. The goal for the sodium content in foods as served within military dining facilities is 1700 milligrams of sodium/1000kcal. (See table 3–1.)

(2) Hard physical work in a high ambient temperature greatly increases the amount of sodium lost in sweat. Sodium losses may reach levels as high as 8000 mg/day (20 grams of salt). Whenever more than 3 liters of water per day are required to replace sweat losses, extra salt intake may be required. The need for extra salt depends on the severity of sweat losses and the degree of acclimatization. Sodium should be replaced through food in both nondiscretionary form and as added salt.

i. Water. As caloric requirements are increased, water needs are also increased. During periods of light to moderate activity in a temperate climate, 1 milliliter of water per calorie expended is a reasonable intake goal. Water requirements may increase from 50 to 100 percent for personnel living in a hot climate expending similar energy levels. Water requirements may increase threefold above normal under conditions of heavy work in a hot environment. Even in cold climates, sweat rates and, consequently, water needs may be quite high due to the hot microclimate that can develop under insulated clothing during heavy physical activity. Inadequate water intakes can be accompanied by a disturbance in electrolyte balance with a resultant performance decrement. (See TB MED 507/NAVMED P–5052–5/AFP 160–1.) Under conditions of normal dietary intake, the preferred fluid to replace losses is cool water. Electrolyte- and sugar-containing solutions are not necessary since glucose and electrolytes are adequately replenished in the normal diet. Under certain conditions, electrolyte and sugar solutions may actually impair rather than enhance performance.

Chapter 3
Military Menu Guidance

3–1. Nutrient density index

a. Table 3–1 lists selected nutrients from the MRDA (table 2–1) for which adequate food composition data are presently available on a nutrient density basis. A nutrient density index (NDI) is provided for both the general military diet and for the reduced calorie menu. (See para 3–2.) The NDI is a technique for evaluating the nutritional adequacy of individual foods, recipes, meals, and cycle menus.

b. The nutrient concentrations per 1000 calories in table 3–1 are based on the recommended calorie intake for healthy male and female personnel at moderate levels of activity. A single nutrient value is recommended for both sexes to simplify use. Because of lower caloric requirements for women, the NDI is generally higher for the female than for the male. Female nutrient values have been adopted for most nutrient densities except for iron and sodium.

c. The computed iron density represents an interpolation between the male and female MRDA for iron. Six milligrams of iron per 1000 calories is considered reasonable and consistent with the amounts of iron found in the usual food supply. This iron density may be inadequate for women. (See para 2–5 *e* .)

d. The NDI for sodium is a target to be achieved in foods as served in military dining facilities.

e. The lower female MRDA for calcium and phosphorus were used to compute the NDI for calcium and phosphorus.

f. Personnel subsisting on a 1500-calorie meal plan require a diet that is nutritionally more dense. Guidance for this type of diet is in the column headed “Reduced calorie menu amount” in table 3–1.

g. It is emphasized that the purpose of representing the MRDA in terms of nutrient densities is for menu evaluation, not for calculating nutrient requirements.

h. The NDI may serve as an important basic tool for nutrition education within the military.

3–2. Reduced calorie menu (1500 kcal)

In support of the military physical fitness and weight control programs, each military dining facility will offer a nutritionally adequate reduced menu (1500 to 1600 kcal/day). Each meal should contain approximately 500 kilocalories except when serving line constraints or unique mission requirements make this impractical. The specified NDI for the reduced calorie menu in table 3–1 provides guidance for reviewing the nutritional quality of the menu. The calories derived from total dietary fat should not exceed 35 percent in the reduced calorie menu. Implementation procedures and exceptions to policy for a reduced calorie menu will be prescribed by each military service.

Chapter 4
Nutrition Education

4–1. Introduction

The following statements about a healthful diet are suggested guidelines to promote fitness in the general military population. Each of the military services should incorporate these guidelines in their nutritional education programs. These statements should guide modification in food procurement policy, food preparation, recipe formulation, and menu development.

4–2. General guidelines for a healthful diet

a. Eat a wide variety of nutritious foods. A well-balanced diet must provide about 50 nutrients, including essential amino acids, carbohydrates, essential fatty acids, vitamins, minerals, water, and dietary fiber. No single food item supplies all the essential nutrients in the amounts required by the body. The greater the variety of foods consumed, the less likely is the chance of developing either a deficiency or an excess of any nutrient. Selection of a diet from a variety of food groups ensures a well-balanced intake of the numerous macronutrients and micronutrients. These groups include—

(1) Whole grains, enriched cereals, and breads.

(2) Fruits and vegetables.

(3) Dry peas and beans.

(4) Meats, poultry, fish, and eggs.

(5) Dairy products.

b. Maintain ideal body weight. Personnel should strive to maintain ideal body weight by consuming only as much energy as is expended. To lose weight, calorie intake should be reduced by decreasing total food intake, especially fats, oils, sugars, and alcohol. Also, physical activity should be increased.

c. Avoid excessive dietary fat. Consumption of fats and oils should be limited during weight reduction and weight maintenance because fats and oils have a high energy density. Military personnel who are identified as being "at risk" of heart disease should reduce saturated fats and cholesterol in their diet and proportionately increase their intake of polyunsaturated fats.

d. Eat foods with adequate starch and fiber. Complex carbohydrates should be increased to make up any calorie deficit due to reduction of fat and refined sugar calories. Emphasis should be placed on fiber-rich foods such as whole grain products, vegetables, and mature legumes.

e. Avoid too much sugar. The major health hazard from eating too much sugar is dental caries. Also, excessive intake of refined sugars may displace other foods that are important sources of essential nutrients.

f. Avoid too much salt. Under normal conditions, an adequate but safe daily intake ranges from 3 to 8 grams (.105 to .28 ounce) of salt (1100 to 3300 milligrams of sodium). Regular consumption of highly salted foods may result in excessive sodium intake. Personnel who are "at risk" of high blood pressure should avoid highly salted foods.

g. Avoid excessive alcohol consumption. Alcoholic beverages have a low nutrient density (that is, they are high in calories and low in other nutrients). Alcoholic beverages can displace valuable nutrient-rich foods in the diet. Impulsive alcohol consumption may lead to acute ethanol toxicity. Sustained, excessive alcohol consumption alters the way nutrients are utilized in the body and may contribute to liver disease and neurological disorders.

Table 2–1
MRDA for selected nutrients[1]

Nutrient	Unit	Male	Female
Energy[2,3]	kcal	3200(2800–3600)	2400(2000–2800)
	MJ	13.4(11.7–15.1)	10.0(8.4–11.7)
Protein[4]	gm	100	80
Vitamin A[5]	mcg RE	1000	800
Vitamin D[6,7]	mcg	5–10	5–10
Vitamin E[8]	mg TE	10	8
Ascorbic Acid	mg	60	60
Thiamin (B_1)	mg	1.6	1.2
Riboflavin (B_2)	mg	1.9	1.4
Niacin[9]	mg NE	21	16
Vitamin B_6	mg	2.2	2.0
Folacin	mcg	400	400
Vitamin B_{12}	mcg	3.0	3.0
Calcium[7]	mg	800–1200	800–1200
Phosphorus[7]	mg	800–1200	800–1200
Magnesium[7]	mg	350–400	300
Iron[7]	mg	10–18	18
Zinc	mg	15	15
Iodine	mcg	150	150
Sodium	mg	See note[10]	See note[10]

Notes:

[1] MRDA for moderately active military personnel, ages 17 to 50 years, are based on the *Recommended Dietary Allowances,*ninth revised edition, 1980.

[2] Energy allowance ranges are estimated to reflect the requirements of 70 percent of the moderately active military population. One megajoule (MJ) equals 239 kcals.

[3] Dietary fat calories should not contribute more than 35 percent of total energy intake.

[4] Protein allowance is based on an estimated protein requirement of 0.8 gm/kilogram (kg) desirable body weight. Using the reference body weight ranges for males of 60 to 79 kilograms and for females of 46 to 63 kilograms, the protein requirement is approximately 48 to 64 grams for males and 37 to 51 grams for females. These amounts have been approximately doubled to reflect the usual protein consumption levels of Americans and to enhance diet acceptability.

[5] One microgram of retinol equivalent (mcg RE) equals 1 microgram of retinol, or 6 micrograms betacarotene, or 5 international units (IU).

[6] As cholecalciferol, 10 micrograms of cholecalciferol equals 400 IU of vitamin D.

[7] High values reflect greater vitamin D, calcium, phosphorus, magnesium, and iron requirements for 17- to 18-year olds than for older ages.

[8] One milligram of alpha-tocopherol equivalent (mg TE) equals 1 milligram d-alpha-tocopherol.

[9] One milligram of niacin equivalent (mg NE) equals 1 milligram niacin or 60 milligrams dietary tryptophan.

[10] The safe and adequate levels for daily sodium intake of 1100 to 3300 mg published in the RDA are currently impractical and unattainable within military food service systems. However, an average of 1700 milligrams of sodium per 1000 kilocalories of food served is the target for military food service systems. This level equates to a daily sodium intake of approximately 5500 milligrams for males and 4100 milligrams for females.

Table 2–2
Estimated safe and adequate daily dietary intake ranges of selected vitamins and minerals[1]

Nutrient	Unit	Amount
Vitamins		
Vitamin K	mcg	70–140
Biotin	mcg	100–200
Pantothenic Acid	mg	4–7
Trace Elements[2]		
Fluoride	mg	1.5–4.0
Selenium	mcg	50–200
Molybdenum	mg	0.15–0.50
Copper	mg	2–3
Manganese	mg	2.5–5.0
Chromium	mcg	50–200
Electrolytes		
Potassium	mg	1875–5625
Chloride	mg	1700–5100

Notes:

[1] This table is based on the *Recommended Dietary Allowances,* ninth edition, 1980, table 10, "Estimated Safe and Adequate Daily Dietary Intakes of Selected Vitamins and Minerals." Estimated ranges are provided for these nutrients because sufficient information upon which to set a recommended allowance is not available. Values reflect a range of recommended intake over an extended period of time.

[2] Since toxic levels for many trace elements may only be several times the usual intakes, the upper levels for the trace elements given in this table should not be habitually exceeded.

Table 2–3
Nutritional standards for operational and restricted rations

Nutrient	Operational Unit[1]	Restricted rations,[2,3]	rations[2,4]
Energy	kcal	3600	1100–1500
Protein	gm	100	50–70
Carbohydrate	gm	440	100–200
Fat	gm	160 (maximum)	50–70
Vitamin A	mcg RE	1000	500
Vitamin D	mcg	10	5
Vitamin E	mg TE	10	5
Ascorbic Acid	mg	60	30
Thiamin	mg	1.8	1.0
Riboflavin	mg	2.2	1.2
Niacin	mg NE	24	13
Vitamin B_6	mg	2.2	1.2
Folacin	mcg	400	200
Vitamin B_{12}	mcg	3	1.5
Calcium	mg	800	400
Phosphorus	mg	800	400
Magnesium	mg	400	200
Iron	mg	18	9
Zinc	mg	15	7.5
Sodium	mg	5000–7000[5]	2500–3500[5]
Potasium	mg	1875–5625	950–2800

Notes:

[1] See notes in table 2–1 for explanation of units.

[2] Values are minimum standards at the time of consumption unless shown as a range or a maximum level.

[3] The operational ration includes the MCI, MRE, A, B, and T rations.

[4] Restricted rations are for use under certain operational scenarios such as long-range patrol, assault, and reconnaissance when troops are required to subsist for short periods (up to 10 days) on an energy restricted ration.

[5] These values do not include salt packets.

Table 3–1
Nutrient density index per 1000 calories for menu planning

Nutrient	Unit	Military diet amount	Reduced calorie menu amount
Protein	gm	33	53
Vitamin A	mcg RE	333	533
Ascorbic Acid	mg	25	40
Thiamin (B_1)	mg	0.5	0.7[1]
Riboflavin (B_2)	mg	0.6	0.8[2]
Niacin	mg	6.7	8.7[3]
Calcium	mg	333	533
Phosphorus	mg	333	533
Magnesium	mg	125	200
Iron	mg	6.0[4]	6.0[4]
Sodium	mg	1700	1700

Notes:

[1] NDI for thiamin is based on a minimum recommended allowance of 1.0 mg/day.

[2] NDI for riboflavin is based on a minimum recommended allowance of 1.2 mg/day.

[3] NDI for niacin is based on a minimum recommended allowance of 13.0 mg/day.

[4] Iron supplementation is recommended for female personnel subsisting on a 1500 kilocalories diet. Levels higher than 6 mg/1000 calories are difficult to attain in a conventional US diet.

Glossary

Section I
Abbreviations

Ca
calcium

DA
Department of the Army

DOD
Department of Defense

gm
gram (1 gm = .035 ounce)

IU
international unit

HQDA
Headquarters, Department of the Army

kcal
kilocalorie

kg
kilogram (2.2 pounds)

lb
pound

mcg
microgram (.000000035 ounce)

mg
milligram (.000035 ounce)

MCI
meal, combat, individual

MJ
megajoule (239 kilocalories)

MRDA
military recommended dietary allowances

MRE
meal, ready-to-eat

NDI
nutrient density index

NE
niacin equivalent

oz
ounce (28.571428 grams)

P
phosphorus

RDA
recommended dietary allowance

RE
retinol equivalent

TSG
The Surgeon General

TE
alpha-tocopherol equivalent

Section II
Terms

Kilocalorie
Energy provided to the body in the form of kilocalories—commonly called calories. One kcal is defined as the amount of heat necessary to raise 1 kg (liter) of water from 15°C to 16°C (59°F to 60.8°F). The joule is the accepted international unit of energy. To convert kcal to joules multiply by the factor of 4. 2. (Example: 9 kcals = 37.8 joules.)

Macronutrients
Nutrients essential for human nutrition in relatively large amounts; examples are carbohydrates, protein, calcium, phosphorus, and sodium.

Micronutrients
Nutrients essential for human nutrition in relatively small amounts; examples are the vitamins, iron, zinc, and copper.

Operational ration
A specially designed ration normally composed of non-perishable items for use under actual or simulated combat conditions. This ration is used in peacetime for emergencies or contingencies, travel, and training.

Ration
The allowance of food for the subsistence of one person for 1 day.

Reference body weight range
A body weight range that covers the average weight for male (60 to 79 kg (132 to 173 lb)) and female (46 to 63 kg (101.2 to 138.6 lb)) military personnel based on average height data. This range is used in this regulation to estimate protein requirements which are computed on a per kilogram body weight basis.

Restricted ration
A light weight, operational ration requiring no further preparation, providing suboptimal levels of energy and nutrients, and intended for short-range patrols.

Section III
Special Abbreviations and Terms
There are no special terms.

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